CLAIMS

What is claimed is:

1. A cardiac lead system, comprising:

a cardiac lead having an electrical conductor, a lumen, and a first stop feature; and

a guide member displaceable within the lumen of the cardiac lead, the guide member comprising:

an elongated body including a second stop feature; and

a guide wire extension extending distal to the elongated body and dimensioned to pass through an external distal opening of the cardiac lead lumen,

wherein engagement of the first stop feature and the second stop feature prevents further advancement of the elongated body through the cardiac lead lumen.

2. The cardiac lead system of claim 1, wherein:

the electrical conductor is a coiled conductor; and

the cardiac lead lumen is defined by the coiled conductor.

3. The cardiac lead system of claim 1, wherein the cardiac lead lumen comprises a multi-diameter lumen.

4. The cardiac lead system of claim 1, wherein the guide member comprises a multi-diameter guide member.

5. The cardiac lead system of claim 1, wherein:

the first stop feature comprises a cardiac lead lumen transition region, wherein an inner diameter of the cardiac lead lumen narrows from a larger outer

diameter to a smaller outer diameter at the cardiac lead lumen transition region; and

the second stop feature is dimensioned to engage the cardiac lead lumen transition region.

6. The cardiac lead system of claim 1, wherein;

the first stop feature is positioned near a distal end of the cardiac lead; and

the second stop feature is positioned near a distal end of the elongated body.

7. The cardiac lead system of claim 1, wherein the second stop feature is positioned between the elongated body and the guide wire extension.

8. The cardiac lead system of claim 1, wherein the guide wire extension comprises an outer diameter smaller than an outer diameter of the elongated body.

9. The cardiac lead system of claim 1, wherein the guide wire extension has a pre-formed shape.

10. The cardiac lead system of claim 1, wherein the guide wire extension is deflectable.

11. The cardiac lead system of claim 1, wherein the guide member is solid.

12. The cardiac lead system of claim 1, wherein the guide wire extension is fixed to the distal end of the elongated body.

13. The cardiac lead system of claim 1, wherein the elongated body comprises a lumen and the guide wire extension is extendible through the lumen of the elongated body.

14. The cardiac lead system of claim 1, wherein the guide wire extension has a predetermined length.

15. The cardiac lead system of claim 1, wherein the guide wire extension has a variable length.

16. The cardiac lead system of claim 1, wherein the guide member further comprises a lumen and moveable core accessible at a proximal end of the guide member, wherein advancing the moveable core through the lumen of the guide member causes a distal deflection of the guide member.

17. The cardiac lead system of claim 1, wherein:

the first stop feature comprises a first set of mating features; and

the second stop feature comprises a second set of mating features compatible with the first set of mating features,

wherein engagement of the first set of mating features and the second set of mating features allows the cardiac lead and the guide member to be concurrently rotated.

18. The cardiac lead system of claim 1, wherein:

the elongated body comprises a lumen and the guide wire extension is extendible through the lumen of the elongated body and beyond a distal end of the elongated body; and

the cardiac lead system further comprising a clamp near the proximal end of the elongated body, the clamp configured to restrict further extension of the guide wire extension through the elongated body upon activation of the clamp.

19. The cardiac lead system of claim 1, wherein:

the elongated body comprises a lumen and the guide wire extension is extendible through the lumen of the elongated body and beyond a distal end of the elongated body; and

the cardiac lead system further comprising a clamp near a proximal end of the elongated body, the clamp configured to lock the guide wire extension and the elongated body together upon activation of the clamp.

20. A cardiac lead system, comprising:

a cardiac lead having an electrical conductor and a lumen, the lumen comprising:

a first portion and a second portion, the second portion of the cardiac lead lumen having an inner diameter smaller than the first portion of the cardiac lead lumen; and

a transition region between the first portion of the cardiac lead lumen and the second portion of the cardiac lead lumen; and

a guide member displaceable within the cardiac lead lumen, the guide member comprising:

an elongated body;

a guide wire extension fixed to a distal end of the elongated body, the guide wire extension having an outer diameter smaller than an outer diameter of the elongated body and dimensioned to allow the guide wire extension to pass into the second portion of the cardiac lead lumen and through an external distal opening of the lumen; and

a transition region between the elongated body and the guide wire extension,

wherein engagement of the transition region of the cardiac lead lumen and the transition region of the guide member prevents further advancement of the guide member through the lumen.

21. The cardiac lead system of claim 20, wherein the electrical conductor is a coiled conductor and the cardiac lead lumen is defined by the coiled conductor.

22. The cardiac lead system of claim 20, wherein the transition region of the cardiac lead lumen is abrupt.

23. The cardiac lead system of claim 20, wherein the transition region of the cardiac lead lumen is tapered.

24. The cardiac lead system of claim 20, wherein the transition region of the guide member is abrupt.

25. The cardiac lead system of claim 20, wherein the transition region of the guide member is tapered.

26. The cardiac lead system of claim 20, wherein:

the cardiac lead lumen comprises a first set of mating features; and

the guide member comprises a second set of mating features compatible with the first set of mating features, wherein engagement of the first set of mating features and the second set of mating features allows the cardiac lead and the guide member to be concurrently rotated.

27. The cardiac lead system of claim 26, wherein one of the first and the second set of mating features comprises one or more slots and another of the first and the second set of mating features comprises one or more protrusions dimensioned to fit within the one or more slots.

28. The cardiac lead system of claim 26, wherein the first set of mating features is positioned within the transition region of the cardiac lead lumen and the second set of mating features is positioned within the transition region of the guide member.

29. The cardiac lead system of claim 20, wherein the guide wire extension has a pre-formed shape.

30. The cardiac lead system of claim 20, wherein the guide wire extension is deflectable.

31. The cardiac lead system of claim 20, wherein the guide member is solid.

32. The cardiac lead system of claim 20, wherein the guide member further comprises a lumen and moveable core accessible at a proximal end of the guide member, wherein advancing the moveable core through the lumen of the guide member causes a distal deflection of the guide member.

33. A cardiac lead system, comprising:

a cardiac lead comprising an electrical conductor and a lumen, the lumen comprising:

a first portion and a second portion, the second portion of the cardiac lead lumen distal the first portion and having an inner diameter smaller than the first portion; and

a transition region between the first portion of the cardiac lead lumen and the second portion of the cardiac lead lumen; and

a guide member displaceable within the cardiac lead lumen, the guide member comprising:

an elongated body having a lumen and a distal end; and

a guide wire displaceable within the lumen of the elongated body, the guide wire dimensioned to allow extension of the guide wire beyond the distal end of the elongated body, into the second portion of the cardiac lead lumen, and through an external distal opening of the cardiac lead lumen,

wherein engagement of the distal end of the elongated body and the transition region of the cardiac lead lumen prevents further advancement of the elongated body through the cardiac lead lumen.

34. The cardiac lead system of claim 33, wherein the electrical conductor is a coiled conductor and the cardiac lead lumen is defined by the coiled conductor.

35. The cardiac lead system of claim 33, wherein the transition region of the cardiac lead lumen is abrupt.

36. The cardiac lead system of claim 33, wherein the transition region of the lumen is tapered.

37. The cardiac lead system of claim 33, wherein:

the cardiac lead lumen comprises a first set of mating features; and

the guide member comprises a second set of mating features compatible with the first set of mating features, wherein engagement of the first set of mating features and the second set of mating features allows the cardiac lead and the guide member to be concurrently rotated.

38. The cardiac lead system of claim 37, wherein one of the first set and the second set of mating features comprises one or more slots and another of the first set and the second set of mating features comprises one or more protrusions dimensioned to fit within the one or more slots.

39. The cardiac lead system of claim 37, wherein the first set of mating features is positioned within the transition region of the lumen and the second set of mating features is positioned near the distal end of the elongated body.

40. The cardiac lead system of claim 33, wherein the guide wire has a pre-formed shape.

41. The cardiac lead system of claim 33, further comprising a clamp at a proximal end of the elongated body, the clamp configured to restrict further advancement of the guide wire through the elongated body upon activation of the clamp.

42. The cardiac lead system of claim 33, further comprising a clamp at a proximal end of the elongated body, the clamp configured to lock the guide wire and the elongated body together.

43. The cardiac lead system of claim 33, wherein a distal portion of the guide wire is deflectable.

44. The cardiac lead system of claim 33, wherein the guide wire further comprises a lumen and moveable core accessible at a proximal end of the guide wire, wherein advancing the moveable core through the guide wire lumen causes a distal deflection of the guide member.

45. A cardiac lead system, comprising:

a cardiac lead having an electrical conductor and a lumen; and

a guide member displaceable within the cardiac lead lumen, the guide member having a distal portion dimensioned to pass through an external distal opening of the cardiac lead lumen; and

a stop mechanism, wherein activation of the stop mechanism prevents further advancement of the guide member through the cardiac lead lumen.

46. The cardiac lead system of claim 45, wherein the stop mechanism is positioned near a distal end of the cardiac lead system.

47. The cardiac lead system of claim 45, wherein the stop mechanism comprises an inflation member.

48. The cardiac lead system of claim 47, wherein the inflation member is positioned on the guide member.

49. The cardiac lead system of claim 45, wherein the stop mechanism comprises a clamp positioned near a proximal end of the cardiac lead system.

50. The cardiac lead system of claim 49, wherein the clamp is positioned external to a patient and is configured to attach a component of the guide member to a component of the cardiac lead upon activation.

51. The cardiac lead system of claim 49, wherein the stop mechanism fixed to at least one component of the guide member and is configured to attach the least one component of the guide member to a component of the cardiac lead upon activation.

52. The cardiac lead system of claim 51, wherein the stop mechanism is configured to attach the at least one component of the guide member to the guide wire.

53. The cardiac lead system of claim 45, wherein the guide member has a pre-formed shape.

54. The cardiac lead system of claim 45, wherein the guide member is deflectable.

55. The cardiac lead system of claim 45, wherein the guide member is solid.

56. The cardiac lead system of claim 45, wherein the guide member further comprises a lumen and moveable core accessible at a proximal end of the guide member, wherein advancing the moveable core through the lumen of the guide member causes a distal deflection of the guide member.

57. A cardiac lead system, comprising:

a cardiac lead having an electrical conductor and a lumen; and

a guide member displaceable within the cardiac lead lumen, the guide member having a distal portion dimensioned to pass through an external distal opening of the cardiac lead lumen; and

an inflation member, wherein activation of the inflation member prevents further advancement of the guide member through the cardiac lead lumen.

58. The cardiac lead system of claim 57, wherein the inflation member is positioned on the guide member, the inflation member dimensioned to engage an inner surface of the cardiac lead lumen upon inflation.

59. The cardiac lead system of claim 57, wherein the inflation member comprises an inflation balloon.

60. The cardiac lead system of claim 57, wherein the inflation member is in communication with an inflation lumen extending from a proximal end of the cardiac lead system.

61. The cardiac lead system of claim 57, wherein the guide member has a pre-formed shape.

62. The cardiac lead system of claim 57, wherein the guide member is deflectable.

63. The cardiac lead system of claim 57, wherein the guide member is solid.

64. The cardiac lead system of claim 57, wherein the guide member further comprises a lumen and moveable core accessible at a proximal end of the guide member, wherein advancing the moveable core through the lumen of the guide member causes a distal deflection of the guide member.

65. A method for advancing a cardiac lead system into a destination vessel, comprising:

providing a cardiac lead having a lumen and an electrical conductor;

providing a guide member displaceable within the cardiac lead lumen;

moving the guide member within the lumen of a cardiac lead so that a distal portion of the guide member extends beyond a distal external opening in the cardiac lead lumen;

engaging a first stop feature of the cardiac lead with a second stop feature of the guide member to provide a push point; and

advancing the cardiac lead into the destination vessel using force applied to the push point.

66. The method of claim 65, wherein providing the cardiac lead having the lumen and the electrical conductor comprises providing the cardiac lead having a coiled electrical conductor, the coiled electrical conductor defining the lumen of the cardiac lead.

67. The method of claim 65, wherein engaging the first stop feature with the second stop feature comprises engaging a transition region of the cardiac lead, formed by a change in an inner diameter of the cardiac lead lumen, with a transition region of the guide member, formed by a change in an outer diameter of the guide member.

68. The method of claim 65, wherein:

providing the guide member comprises providing the guide member having a hollow elongated body and a guide wire displaceable within the hollow elongated body, the guide wire extendable beyond a distal end of the hollow elongated body; and

engaging the first stop feature with the second stop feature comprises engaging a transition region of the cardiac lead, formed by a change in an inner diameter of the cardiac lead lumen, with the distal end of the hollow elongated body.

69. The method of claim 68, further comprising clamping the guide wire to prevent further advancement of the guide wire through the hollow elongated body.

70. The method of claim 65, wherein:

providing the cardiac lead comprises providing the cardiac lead having a first set of mating features;

providing the guide member comprises providing the guide member having a second set of mating features compatible with the first set of mating features; and

the method further comprising engaging the first set of mating features with the second mating features to allow concurrent rotation of the guide member and the cardiac lead.

71. The method of claim 65, further comprising deflecting a distal portion of the guide member.

72. The method of claim 71, wherein:

providing the guide member comprises providing the guide member having a lumen and a moveable core displaceable within the guide member lumen; and

deflecting the distal portion of the guide member comprises advancing the moveable core into the distal portion of the guide member.

73. A method for advancing a cardiac lead system into a destination vessel, comprising:

providing a cardiac lead having a lumen and an electrical conductor;

providing a guide member displaceable within the cardiac lead lumen;

moving the guide member within the cardiac lead lumen so that a distal portion of the guide member extends beyond a distal external opening in the cardiac lead lumen;

activating a stop mechanism to prevent further advancement of the guide member through the cardiac lead lumen; and

moving the cardiac lead and the guide member together in the destination vessel.

74. The method of claim 73, wherein providing the cardiac lead having the lumen and the electrical conductor comprises providing the cardiac lead having a coiled electrical conductor, the coiled electrical conductor defining the lumen of the cardiac lead.

75. The method of claim 73, wherein activating the stop mechanism comprises inflating an inflation member within the cardiac lead lumen.

76. The method of claim 73, wherein activating the stop mechanism comprises clamping a component of the cardiac lead to the guide member external to a patient.

77. The method of claim 73, wherein activating the stop mechanism allows concurrent rotation of the guide member and the cardiac lead.

78. The method of claim 73, wherein activating the stop mechanism provides a push point for advancing the guide member and the cardiac lead together into the destination vessel by force applied to the push point.

79. The method of claim 73, further comprising deflecting a distal portion of the guide member.

80. The method of claim 73, wherein:

providing the guide member comprises providing the guide member having a lumen and a moveable core displaceable within the guide member lumen; and

the method further comprising deflecting a distal portion of the guide member comprises deflecting a distal portion of the guide member by advancing the moveable core into the distal portion of the guide member.

81. A cardiac lead system, comprising:

means for moving a guide member within a lumen of a cardiac lead so that a distal portion of the guide member extends beyond a distal external opening in the cardiac lead lumen;

means for engaging a first stop feature of the cardiac lead with a second stop feature of the guide member to provide a push point for advancing the cardiac lead through a destination vessel; and

means for moving the cardiac lead into the destination vessel using force applied to the push point.

82. The method of claim 81, further comprising means for engaging a first set of mating features on the guide member and a second set of mating features on the cardiac lead to allow concurrent rotation of guide member and the cardiac lead.

83. The method of claim 81, further comprising means for deflecting a distal portion of the guide member.

84. A cardiac lead system, comprising:

means for moving a guide member within a lumen of a cardiac lead so that a distal portion of the guide member extends beyond a distal external opening in the cardiac lead lumen;

means for activating a stop mechanism to prevent further advancement of the guide member through the cardiac lead lumen; and

means for moving the guide member and cardiac lead together into a destination vessel.